G-FORCE PUSH-PUSH LATCH

DESCRIPTION

TECHNICAL FIELD

[Para 1] The present invention generally relates to a latch system used in association with automotive compartments. The present invention more particularly relates to a push-push latch for use in any compartment in an automobile within the head impact zone.

BACKGROUND OF THE INVENTION

[Para 2] Push-push latches are being used much more frequently in automotive compartments. There is a large probability that in the event of an accident, the push-push latch will be subjected to a force that opens the compartment and allows the objects within the compartment to exit as projectiles. Therefore, there is a need to retain the latch in a closed position in the event that the latch is subjected to an excessive force.

SUMMARY OF THE INVENTION

[Para 3] The present invention addresses this need by providing a push-push latch that can be used in association with an automotive compartment where the latch includes a track member that defines a generally heart shaped track having a V-shaped notch and a guide member that moves within the track to facilitate positioning the compartment door in the closed position when the guide member rests in the V-shaped notch. Further, the track member is molded from a polymer and includes an integrated retaining section that is positioned adjacent the V-shaped notch and a channel that connects the heart-shaped track to the retaining section.

BRIEF DESCRIPTION OF THE DRAWING

[Para 4] The present invention will be described by way of example with reference to the following drawings:

[Para 5] Figure 1 illustrates a cutaway side view of an automotive compartment with the door in the open position.

[Para 6] Figure 2 illustrates a cutaway side view of an automotive overhead compartment with the door in the closed position.

[Para 7] Figure 3 illustrates a sectional view of the track member with the guide member in the opened position.

[Para 8] Figure 4 illustrates a sectional view of the track member with the guide member in the closed position.

[Para 9] Figure 5 illustrates a sectional view of the track member locked into the retaining section.

[Para 10] Figure 6 is a flowchart illustrating the preferred method of this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[Para 11] The push-push latch of the present invention, shown generally at 20 in Figures 1-5, is used in association with a storage compartment 22 in an automobile to facilitate moving the compartment door 24 between an opened position, as illustrated in Figure 1, and a closed position, as illustrated in Figure 2. It should be noted that the push-push latch of the present invention is not limited to automotive compartments, rather, it can be used in association with any compartment or environment that requires a latch.

[Para 12] When the door 24 is in the open position it is pushed by a user inwardly toward the compartment body 26 and engaged in the closed position. To open the door 24 from the closed position, the door 24 is again pushed inwardly toward the compartment body 26 and the latch 20 is disengaged, thus releasing the door 24 into the open position. In the event that the compartment door 24 is closed and subjected to a force that exceeds a predetermined value, the door 24 will become locked in the closed position.

[Para 13] Referring to Figure 3, the push-push latch 20 includes a track member 30 and a guide member 32. The track member 30 is molded from a polymer and defines a generally heart shaped track 34 having a V-shaped notch 36. The guide member 32 moves within the track 34 to facilitate positioning the compartment door 24 between the closed position and the opened position.

[Para 14] There is a connector 38, shown in Figure 1, that is permanently attached to the compartment door 24 and that engages the push-push latch 20. In other words, neither the track member 30 nor the guide member 32 is permanently attached to the compartment door 24. Rather, the connector 38 engages either the track member 30 or the guide member 32 depending on the configuration of the system.

[Para 15] The heart-shaped track 34 includes pathway A also referred to as first pathway 40, pathway B also referred to as second pathway 42, first corner 44, pathway C also referred to as third pathway 46, the V-shaped notch 36, pathway D also referred to as fourth pathway 48, second corner 50, and pathway E also referred to as fifth pathway 52. The V-shaped notch 36 includes a wall 54 that assists in retaining guide member 32 in the closed position.

[Para 16] It is important to note that track member 30 has the ability to move axially along axis 56 and that guide member 32 has the ability to move radially with respect to axis 56.

[Para 17] Referring to Figure 3, under normal circumstances when the door 24 of the compartment 22 is in the opened position the guide member 32 is resting in pathway A 40. When a force is exerted on the door 24 to push it into the closed position, the connector 38 on the compartment door 24 engages the push-push latch 20. This engagement forces guide member 32 to move from pathway A 40 into pathway B 42 and travel along the length of pathway B 42, and around the first corner 44 into pathway C 46. Guide member 32 moves along the length of pathway C 46 and comes to a rest at the V-shaped notch 36. Therefore, when in the closed position the guide member 32 is positioned in the V-shaped notch 36 of the track member 30 resting against wall 54.

[Para 18] When a force is exerted on the compartment door 24 in an effort to move the door 24 from the closed position to the opened position, under normal circumstances, guide member 32 is forced out from V-shaped notch 36 and into pathway D 48. After traveling the length of pathway D 48 guide member 32 moves around the second corner 50 and travels down the length of pathway E 52. Pathway E 52 merges into pathway A 40 and guide member 32 comes to a rest back in pathway A 40. The connector 38 disengages from the push-push latch 20 once guide member 32 is positioned within pathway A 40 causing the compartment door 24 to move into the opened position.

[Para 19] The majority of the time the compartment door 24 is going to be in the closed position. A user typically will open the door 24 only to put an object into the compartment 22 or to remove an object from the compartment 22 and immediately return the door 24 to the closed position. Therefore, the guide member 32 rests in the V-shaped notch 36 of the track member 30 the majority of the time.

[Para 20] In the event of an automobile collision, there is a chance that the compartment door 24 will be subjected to an excessive force. Therefore, it is desired to keep the door 24 locked in its closed position under such circumstances, rather than being allowed to open thereby subjecting the vehicle occupant to an open door member or exposing them to the objects contained within the storage compartment 22. To address this situation, the present invention provides for a track member 30 that is molded from a polymer and includes an integrated retaining section 28 that is

positioned adjacent the V-shaped notch 36 and a channel 58 that connects the heart-shaped track 34 to the retaining section 28.

[Para 21] A force is considered to be excessive when it exceeds a predetermined value. One skilled in the art of push-push latches has the knowledge to define the parameters of an excessive force, but a typical range is 10-80 G's. If the force is less than the predetermined value, then the guide member 32 will move along the track member 30 as defined under normal conditions. However, if the force is greater than or equal to the predetermined value, then the guide member 32 will be forced into retaining section 28. Guide member 32 engages the channel 58, forcing the walls 60 of the channel 58 to flex out in the radial direction with respect to axis 56 and the guide member 32 will move and lock into the retaining section 28. Once the guide member 32 is in the retaining section 28, the channel walls 60 will flex back into their normal positions. Once positioned in the retaining section 28, the compartment door 24 will lock in a closed position and will not open unless the guide member 32 is manually reset out of the retaining section 28.

[Para 22] Figure 6 schematically illustrates the preferred method of the invention 20. The flow chart 120 includes subjecting the door of the compartment to an excessive force at 122. At 124, the guide member is forced through the channel in the track member wherein the channel walls flex out allowing the guide member through. The guide member is retained in a retaining section that is an integral part of the track member when the channel walls flex back in, as illustrated at 126. When desired, the guide member must be manually removed from the retaining section at 128.

[Para 23] While the present invention has been described in what is presently considered to be its most practical and preferred embodiment or implementation, it is to be understood that the invention is not to be limited to the disclosed embodiment. On the contrary, the present invention is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, which scope is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures as is permitted under the law.